

## Describing and Explaining shapes of molecules

**QUESTION:** Describe and Explain why the bond angles (for the molecules in the questions below) are different. In your answer, you must make reference to the arrangement of electrons...

1) The following table shows the Lewis structures and bond angles for the molecules  $\text{SO}_2$  and  $\text{H}_2\text{CO}$ .

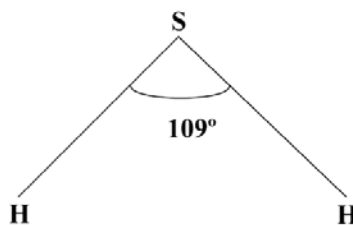
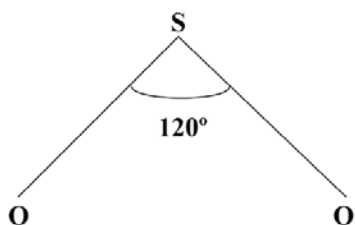
Molecule	$\text{SO}_2$	$\text{H}_2\text{CO}$
Lewis structure	$\text{O}::\text{S}::\text{O}:$	$\begin{array}{c} \text{H} \\ \diagup \\ \text{C}::\text{O} \\ \diagdown \\ \text{H} \end{array}$
Approximate bond angle around the central atom	$120^\circ$	$120^\circ$

Explain why these molecules have different shapes, but have the same approximate bond angle.

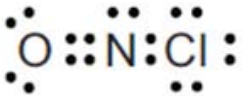
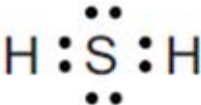
In your answer you should include:

- the shapes of  $\text{SO}_2$  and  $\text{H}_2\text{CO}$
- factors which determine the shape of each molecule
- an explanation of why the approximate bond angle is the same by referring to the arrangement of electrons for each molecule.

2) The shapes of the two molecules  $\text{SO}_2$  and  $\text{H}_2\text{S}$  are shown in the diagram below. The shape of both molecules is described as bent.



3)

	NOCl	H <sub>2</sub> S
<b>Lewis structure</b>		
<b>Name of shape</b>	bent	bent

The shape of both molecules can be described as bent. However, these molecules do not have the same bond angle. Discuss why these molecules have different bond angles.

Your answer must include:

- factors which determine the shape of each molecule
- the approximate bond angle for each molecule.

4) Molecules of water (H<sub>2</sub>O) and ozone (O<sub>3</sub>) each contain 3 atoms and both the molecules are bent. However, the bond angle in H<sub>2</sub>O is significantly smaller than the bond angle in O<sub>3</sub>.